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Chapter 337. WATER HYGIENE

Subchapter B. DESIGN STANDARDS FOR PUBLIC SWIMMING POOL CONSTRUCTION

Chapter 337. DESIGN STANDARDS FOR PUBLIC SWIMMING POOL CONSTRUCTION

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§ 337.71 Definitions

The following words and terms, when used in this chapter, shall have the following meanings, unless the context clearly indicates otherwise.

- (1) Swimming pool-Any structure, basin, chamber, or tank containing an artificial body of water for swimming, diving, or recreational bathing and having a depth of two feet or more at any point.
- (2) Public swimming pool-Any swimming pool, other than a private residential swimming pool, intended to be used collectively by numbers of persons for swimming or bathing operated by any person as defined herein, whether he be owner, lessee, operator, licensee or concessionaire, regardless of whether a fee is charged for such use.
- (3) Private residential swimming pool-Any swimming pool located on private property under the control of the home owner, the use of which is limited to swimming or bathing by members of his family or their invited guests. (The design, construction, and operation of such pools are not subject to the provisions of these standards.)

§ 337.72 Purpose

These design standards have been adopted to insure the inclusion of all data essential to an intelligent consideration of the contemplated project or improvement. These standards do not necessarily meet AAU standards.

§ 337.73 Examination and Approval of Plans

- (a) Representatives of the State Department of Health are not authorized to examine and approve plans for swimming pools for a designing engineer unless he has submitted a letter of appointment from the owner stating that he is authorized to prepare plans and specifications.
- (b) Plans will not be considered adequate unless a registered professional engineer has been retained for the design and supervision of construction of the proposed improvements.
- (c) Although the State Department of Health furnishes consultation services and advice as the reviewing body, its employees may not act as designing engineers or furnish detailed estimates.
- (d) The State Department of Health does not examine plans and specifications in regard to the structural features of the design such as strength of concrete or adequacy of reinforcing. Plans of swimming pools

are examined as to the features of the design which concern the principles of operation and water treatment and other public health engineering aspects.

(e) Plans should be submitted for examination at least two weeks prior to the time that approval or recommendations by the department are desired. From this it is not necessarily to be inferred that recommendations by the department will be forthcoming within the time mentioned.

§ 337.74 Plans and Specifications

(a) The plans for the swimming pool shall include a general plan upon which areas reserved for future extensions are clearly shown, as well as detailed plans of the various units and structures. To be included also are details and descriptions of all appurtenances such as valves, pumps, filter media, etc. Sufficient longitudinal and cross sections or profiles through the entire plant must also be submitted. Detail plans should show longitudinal and transverse sections sufficiently to explain the construction of each unit.

(b) All drawings submitted shall be neatly and plainly executed and may be traced directly on tracing cloth, printed on transparent cloth, or printed on any of the various papers which give distinct lines. All prints shall be clear and legible. The following dimensions are suggested for ordinary use: distance from top to bottom, 20 inches to 30 inches; length, 24 inches, 32 inches, 40 inches, 48 inches, or 60 inches. By this section it is intended to prevent the use of unnecessarily large maps, which are difficult to file or use.

(c) Each drawing shall have legibly printed thereon the name of the town or persons for whom the drawing is made, the name of the engineer in charge, the date, the scale, and such references and titles as are necessary for the complete understanding of each drawing.

(d) Specifications for the construction of swimming pool shall accompany all plans for new or original pools. With plans for extensions of existing pools, specifications may be omitted, provided that those extensions are to be constructed in accordance with specifications filed previously with original plans.

(e) If the plans are solely for the extensions of an existing pool, only such information as is necessary for the comprehension of the plans will be required. This information, in general, must conform to the above requirements for a complete system.

§ 337.75 Engineering Report

A report, which should be written by the designing engineer, shall accompany all plans for complete systems and shall give all data upon which the design is based and shall include the following.

(1) Maximum number of swimmers and non-swimmers expected daily.

(2) Source of water supply to be used.

(3) Manner of disposal of backwash and drain water.

(4) Manner of disposal of sanitary sewage.

(5) The method of water treatment to be adopted and a description of each unit in the system.

(6) The method of disinfection, the quantity per million parts of water and the method of application.

(7) All conditions which may in any way affect the design or operation of the pool.

§ 337.76 Water Supply

(a) The water supply serving the swimming pool and all plumbing fixtures, including drinking fountains, lavatories, and showers, shall meet the requirements of the Texas State Department of Health.

(b) All portions of the water distribution system serving the swimming pool and auxiliary facilities shall be protected against backflow. Water introduced into the pool or surge tank shall be supplied through an approved air gap or the fresh water inlet may be submerged in the pool or make-up tank if protected by a properly installed vacuum breaker. (PHS 1962 of ASA A40.8-1955)

§ 337.77 Sewer System

(a) The sanitary sewer system shall be adequate to serve the facility, including bathhouse, locker room, and related accommodations.

(b) There shall be no direct physical connection between the sanitary sewer system and any drain from the swimming pool or recirculation system. Any swimming pool or gutter drain or overflow from the recirculation system, when discharged to the sanitary sewer system, shall connect through a suitable air gap so as to preclude possibility of backup of sewage into the swimming pool piping system.

(c) Valves and/or pumps or both used for draining swimming pools shall be sized or controlled to prevent the surcharging of the sewer.

(d) The sanitary sewer serving the swimming pool and auxiliary facilities shall discharge to the public sewer system wherever possible. Where no such sewer system is available, the connection shall be made to a suitable disposal plant designed, constructed, and operated in accordance with the requirements of the Texas State Department of Health.

§ 337.78 Swimming Pool Construction Materials

(a) Swimming pools and all appurtenances thereto shall be constructed of materials which are inert, non-toxic to man, impervious, and permanent; which can withstand the design stresses; which will provide a tight tank with

a smooth and easily cleaned surface, or to which a smooth, easily cleaned surface finish can be applied and which must be finished in white or light color.

(b) Sand or earth bottoms are not permitted in swimming pool construction.

§ 337.79 Design Detail and Structural Stability

(a) All swimming pools shall be designed and constructed to withstand all anticipated loading for both full and empty conditions. A hydrostatic relief method shall be provided in areas having a high water table. The designing engineer shall be responsible for certifying to the structural stability and safety of the pool.

(b) No limits are specified for length and width of swimming pools except that swimming pools used for competition should meet required dimensions, and the requirements for diving areas as outlined in § 337.91 shall be observed. Consideration shall be given to shape from the standpoint of safety and the need to facilitate supervision of bathers using the pool.

(c) Provisions shall be made for complete, continued circulation of water through all parts of the swimming pool. All swimming pools shall have a recirculation system with necessary treatment and filtration equipment as required in these standards.

(d) The shape of any swimming pool shall be such that the circulation of pool water and control of swimmers' safety are not impaired.

(e) The minimum depth of water in the swimming pool shall be three feet except for special purpose swimming pools or for restricted or recessed areas in general swimming pools which are set aside primarily for the use of children. Such areas, when included as part of the swimming pool, shall be separated from the swimming pool proper by means of a safety line supported by buoys and attached to the side walls. Wading facilities for children shall be physically separated from the swimming pool. Such facilities shall be served by the swimming pool or separate recirculation system with turn over rates of once every two hours.

(f) The maximum depth at the shallowest end of the swimming pool shall not exceed three feet six inches except for competitive or special purpose swimming pools.

§ 337.80 Depth Markings and Lines

(a) Depth of water shall be plainly marked at or above the water surface on the vertical wall of the swimming pool and on the edge of the deck or walk next to the swimming pool at maximum and minimum points and at the points of break between the deep and shallow portions and at intermediate 1-foot increments of depth in the shallow end and spaced at not more than 25-foot intervals measured peripherally. The depth in the diving areas will be appropriately marked.

(b) Depth markers shall be in numerals of four inches minimum height and a color contrasting with

background. Where depth markers cannot be placed on the vertical walls above the water level, other means shall be used, said markings to be plainly visible to persons in the swimming pool.

§ 337.81 Inlets and Outlets

(a) All swimming pools shall be provided with an outlet at the deepest point to permit the pool to be completely and easily emptied. Openings must be covered by a proper grating which is not readily removable by bathers. Outlet openings of the grating in the floor of the pool shall be at least four times the area of discharge pipe or provide sufficient area so the maximum velocity of the water passing the grate will not exceed 1 ½ feet per second. The maximum width of the grate openings shall be not over one inch.

(b) Multiple main drain outlets shall be provided where the width of the pool is more than 30 feet. In such cases, outlets shall be spaced not more than 30 feet apart nor more than 15 feet from side walls.

(c) Inlets shall be located to produce uniform circulation of water and to facilitate the maintenance of a uniform disinfectant residual throughout the entire swimming pool without existence of dead spots. Inlets from the recirculation system shall not project more than one inch beyond the pool wall surface and shall be submerged at least 12 inches below the water level. Inlets in the pool bottom shall be flush with the floor. In neither case shall there be any sharp edges. When water from a potable water system is added to the pool, it shall be in compliance with § 337.76(b).

(d) Where the distance across any portion of the swimming pool is more than 30 feet, multiple inlets must be provided on opposite sides. Water velocity in the pipe serving an individual inlet shall be between four and 12 feet per second. The minimum number of inlets shall be calculated by dividing the swimming pool perimeter length in feet by 15, or the minimum number of inlets for a swimming pool having a volume of 66,000 gallons or less may be based on one inlet for each 6,000 gallons or fraction thereof pool volume. In any case, an adequate number of inlets shall be provided, properly spaced and located to accomplish complete and uniform recirculation of water and maintenance of uniform disinfectant residuals at all times.

(e) Each inlet shall be designed as an orifice subject to adjustment, or must be provided with an individual gate valve or similar device to permit adjustment of water volume to obtain the best circulation. The inlet piping system shall be hydraulically designed to prevent friction loss between inlets of more than 3 feet.

§ 337.82 Slope of Bottom

The slope of the bottom of any portion of the swimming pool having a water depth of less than five feet shall not be more than one foot in eight feet and said slope shall be uniform. In portions with a depth greater than five feet, the slope shall not exceed one foot in three feet.

§ 337.83 Side Walls

(a) Walls of a swimming pool in the diving areas shall be either (1) vertical for water depths of at least six feet, or (2) vertical for a distance of three feet or more below the water level below which the wall may be curved to

the bottom with a radius not greater than five feet and not greater than the difference between the depth at that point and the vertical side depth.

(b) Safety ledges, when provided on vertical walls in the deep portion of the swimming pool, shall be not over six inches wide, at least four feet below the water surface and shall slope 1/2 inch in six inches toward the pool.

§ 337.84 Overflow Gutters

(a) All swimming pools shall be provided either with overflow gutters or skimmers.

(b) Overflow gutters shall extend completely around the swimming pool except at steps or recessed ladders. The overflow gutter shall serve as a hand-hold. This gutter shall be capable of continuously removing 50% or more of the recirculated water and return it to the filter. All overflow gutters shall be discharged to waste or connected

to the recirculation system through a properly designed surge tank. The gutter, drains, and return piping to the surge tank shall be designed to remove rapidly overflow water caused by recirculation displacement, wave action or other causes produced from the maximum pool bathing load. The opening into the gutter beneath the coping shall be not less than four inches wide with a depth of at least three inches. Gutters shall be designed to prevent entrance or entrapment of bathers' arms or legs. The overflow edge or lip shall be rounded and not thicker than 2 ½ inches for the top two inches. The overflow outlets shall be provided with outlet pipes which shall in any case be at least two inches in diameter. The outlet fittings shall have a clear opening in the grating at least equal to 1 ½ times the cross sectional area of the outlet pipe.

(c) Nothing in this section shall preclude the use of roll-out or deck level type swimming pools. Such designs shall conform to the general provisions relating to overflow rates. The design of the curb and handhold shall conform to accepted standards, and the approval shall be based on detailed review of this feature of construction and evaluated in the light of proposed use of the pool.

§ 337.85 Skimmers

Skimmers are permitted on public swimming pools providing approved handholds are installed and sufficient motion to the pool water is induced by the pressure return inlets. At least one skimming device shall be provided for each 500 square feet of water surface area or fraction thereof. Skimmers shall be so

located as to minimize interference with each other and to insure maximum skimming action. Handholds shall consist of bull-nosed coping not over three inches thick for the outer 1 ½ inches or an equivalent approved handhold. The handholds must be no more than 9 inches above the normal water line. Skimming devices shall be built into the pool wall and shall meet the following general specifications.

(1) The piping and other pertinent components of skimming equipment shall be designed for a total capacity of 65% to 80% of the required filter flow of the recirculating system and no skimmer shall be designed for a flow-through rate of less than 30 gallons per minute or 3.75 gallons per minute per lineal inch of weir.

(2) The skimmer weir shall be automatically adjustable and shall operate freely with continuous action to variations in water level over a range of at least four inches. The weir shall operate at all flow variations as described in subsection(a). The weir shall be of such buoyance and design so as to develop an effective velocity.

(3) An easily removable and cleanable basket or screen through which all overflow water must pass shall be provided to trap large solids.

(4) The skimmer shall be provided with a device to prevent air lock in the suction line. If an equalizer pipe is used, it shall provide an adequate amount of water for pump suction should the water of the swimming pool drop below the weir level, provided that if any other device, surge tank, or arrangement is used, a sufficient amount of water for pump suction shall be assured.

(5) Where the equalizer is used, it shall be sized to meet the capacity requirements of the filter and pump and shall in no case be less than two inches in diameter. The pipe shall be located at least one foot below the lowest overflow level of the skimmer. It shall be provided with a valve or equivalent device that will remain tightly closed under normal operating conditions but will automatically open when the water level drops as much as two inches below the lowest weir level.

(6) The skimmer shall be of sturdy, corrosion-resistant materials.

§ 337.86 Recirculation Systems

(a) A recirculation system, consisting of pumps, piping, filters, water conditioning and disinfection equipment and other accessory equipment, shall be provided which will clarify and disinfect the swimming pool volume of water in eight hours or less, thus providing a minimum turnover of at least three times in 24 hours except that the recirculation rate shall be increased to provide a six hour turn-over for swimming pools subjected to heavy bather loads.

(b) All piping shall be designed to give a reasonable amount of friction losses and to carry the required quantity of water at a maximum velocity not to exceed 12 feet per second in plastic or copper pipe. Piping shall be of non-toxic material, resistant to corrosion and able to withstand operating pressures. Pipes shall be identified by a color code or tags.

(c) The recirculation system shall include a strainer to prevent hair, lint, etc. , from reaching the pump and

filters. Strainers shall be corrosion resistant with openings not more than 1/8 inch in size, providing a free-flow area at least four times the area of pump suction line and shall be readily accessible for frequent cleaning.

(d) A vacuum cleaning system shall be provided. When it is an integral part of the recirculation system, a sufficient number of connections shall be located in walls of the swimming pool at least eight inches below the water line.

(e) A rate-of-flow indicator, reading in gallons per minute, shall be installed and located preferably on the pump discharge pipe to the filters so that the rate of recirculation and backwash rate will be indicated. The indicator shall be capable of flows measuring at least 1 ½ times the design flow rate, shall be accurate within 10% of true flow and shall be easy to read.

(f) Pumps shall be of adequate capacity to provide the required number of turnovers of swimming pool water as specified in subsection (a), and whenever possible shall be so located as to eliminate need for priming. If the pump or suction piping is located above the overflow level of the pool, the pump shall have a priming device.

The pump or pumps shall be capable of providing flow adequate for the backwashing of filters where required. Under normal conditions, the pump or pumps shall supply the recirculation rate of flow at a dynamic head of at least 40 feet.

(g) Swimming pools equipped with heaters shall have a fixed thermometer in the recirculation line at the heater outlet.

§ 337.87 Sand Type Filters

The following requirements are equally applicable to either gravity or pressure sand type filters.

(1) Sand type filters shall be designed for a filter rate of three gallons per minute per square foot of bed area at time of maximum head loss with sufficient area to meet the design rate of flow required by the prescribed turnover.

(2) Filtering material shall consist of at least 18 inches of screened, sharp filter sand with an effective size between 0.4mm and 0.55mm., and a uniformity co-efficient not exceeding 1.75mm, supported by at least 10 inches of graded filter gravel. Anthracite having an effective size between 0.6mm and 0.8mm., with a uniformity co-efficient of not greater than 1.8mm, may be used in lieu of the sand. The gravel shall effectively distribute water uniformly during filtration and backwashing. A reduction in this depth or an elimination of gravel may be permitted where equivalent performance and services are demonstrated.

(3) The underdrain system shall be of corrosion resistant and enduring material, so designed and of such material that the orifices or other openings will maintain approximately constant area. It shall be designed to provide even collection or distribution of the flow during filtration and backwashing.

(4) At least 12 inches of freeboard shall be provided between the upper surface of the filter media and the

lowest portion of the pipes or drains which serve as overflows during backwashing.

(5) Pressure filter systems shall be provided with influent and effluent pressure gauges, backwash sight glass on the waste discharge line and air relief at or near the high point of the filter.

(6) The filter system shall be designed with necessary valves and piping to permit the following:

(A) Filtering to the swimming pool.

(B) Individual backwashing of filters to waste at a rate of nine gallons to 15 gallons per minute per square foot of effective filter area.

(C) Complete drainage of all parts of the system.

(D) Necessary maintenance, operation and inspection.

(7) Each pressure type filter tank shall be provided with an access opening of not less than a standard 11-inch by 15-inch manhole and cover.

(8) Where needed, means shall be provided for adding chemicals ahead of the filters.

(9) On pressure type filters, the tank and its integral parts shall be constructed of substantial material capable of withstanding continuous usage and shall be designed for a pressure safety factor of four based on the maximum shutoff head of the pump. This shutoff head for design purposes shall in no case be considered less than 50 pounds per square inch.

§ 337.88 Diatomaceous Earth-Type Filters

(a) Sufficient filtering area shall be provided to meet the design pump capacity as required by § 337.86(f).

(b) Rate of filtration.

(1) Pressure filters: The design rate of filtration shall not be greater than 2.0 gpm/sq. feet of effective filtering surface without continuous body feed and not greater than 2.5 gpm/sq feet with continuous feed.

(2) Vacuum filters: The design rate of filtration shall not be greater than 1.0 gpm/sq feet of effective filtering surface without continuous body feed and not greater than 1.5 gpm/sq feet with continuous body feed.

(c) Where body feed is provided, the device shall be accurate (10%) and dependable and shall be capable of continually feeding within a calibrated range adjustable from 2 to 6 ppm at the design capacity of the recirculation pump.

(d) Filtering area, where fabric is used, shall be determined on the basis of effective filtering surfaces as

created by the septum supports, with no allowances for areas of impaired filtration, such as broad supports, folds or portions which may bridge.

(e) The filter and all component parts shall be of such materials, design, and construction to withstand normal, continuous use without significant deformation, deterioration, corrosion, or wear, which could adversely affect filter operation.

(f) The filter should be so designed and constructed, or provision made to preclude the introduction of appreciable quantities of filter-aid into the pool during precoating operations.

(g) The tank containing the filter elements shall be constructed of steel, plastic or other suitable material which will satisfactorily provide resistance to corrosion with or without coating. Pressure type filters shall be designed for a minimum working pressure of 50 pounds per square inch with a four to one safety factor. Vacuum type filters shall be designed to withstand the pressure developed by the weight of the water contained therein, and closed vacuum type filters shall, in addition, be designed to withstand the crushing pressure developed under a vacuum of 25 inches or mercury with a safety factor of 1.5 in both instances. The septa or elements which support the filter-aid shall be of corrosion resistant material. The septa shall be constructed to be resistant to rupture under conditions of the maximum differential pressure between influent and effluent which can be developed by the circulating pump and of adequate strength to resist any additional stresses developed by the cleaning operation.

(h) Where dissimilar metals which may set up galvanic electric currents are used in the filters, provision shall be made to resist electrolytic corrosion. The filters shall be designed in such a manner that they may be easily disassembled, with allowances made for adequate working space above and around the filter to allow the removal and replacement of any part and for proper maintenance.

(i) The filter plant shall be provided with such pressure, vacuum, or compound gauges as are required to indicate the condition of the filter. Pressure filters shall be provided with air relief valves. In vacuum type filter installations where the circulation pump is two horsepower or higher, an adjustable high vacuum automatic shutoff should be provided to prevent damage to the pump by cavitation.

(j) All filters shall be equipped for cleaning by one or more of the following methods: backwashing, air-bump-assist backwashing, spray wash (mechanical or manual), or agitation.

(k) Provision shall be made for completely and rapidly draining the filter.

§ 337.89 Ladders, Recessed Treads, and Stairs

(a) Steps or ladders shall be provided at the shallow end of the swimming pool if the vertical distance from the

bottom of the pool to the deck or walk is over two feet. Ladders or recessed steps shall be provided at the deep portion of the swimming pool, and if the pool is over 30 feet wide, such steps or ladders shall be installed on each side.

(b) Steps leading into the swimming pool shall be of non-slip design, have a minimum tread of 12 inches and a maximum rise or height of 10 inches. There shall be no abrupt drop-off or submerged projections into the pool, unless guarded by handrails.

(c) Swimming pool ladders shall be corrosion resistant and shall be equipped with non-slip treads. All ladders shall be so designed as to provide a handhold and shall be rigidly installed. There shall be a clearance of not more than five inches nor less than three inches between any ladder and the pool wall. If steps are inserted in the walls or if stepholes are provided, they shall be of such design that they may be cleaned readily and shall be arranged to drain into the pool to prevent the accumulation of dirt thereon. Stepholes shall have a minimum tread of five inches and a minimum width of 14 inches.

(d) Where steps, stepholes, or ladders are provided with the swimming pool, there shall be a handrail at the top of both sides thereof extending over the coping or edge of the deck.

(e) Supports, platforms and steps for diving boards shall be of substantial construction and of sufficient structural strength to safely carry the maximum anticipated loads. Steps shall be of corrosion resistant material, easily cleanable and of non-slip design. Handrails shall be provided at all steps and ladders leading to diving

boards more than one meter above the water. Platforms and diving boards which are over one meter high shall be protected with guard railings.

§ 337.90 Decks and Walkways

A continuous deck at least four feet (and preferably eight or more feet) wide shall extend completely around the swimming pool. The deck shall be sloped away from the pool to drain at a grade of 1/4 inch to 3/8 inch per lineal foot and shall have a non-slip surface. Deck drains shall not be connected to the recirculation system.

§ 337.91 Diving Areas

In order to incorporate necessary safety into the construction of diving area, the dimensions shall be the minimum used in sizing diving areas as diagrammed in the table entitled "Minimum depths and clearances for diving boards", prepared by the department's environmental engineering division. The Texas Department of Health adopts by reference this table and copies of it are attached at the end of these sections and other copies are indexed and filed in the department's Environmental Engineering Division, 1100 West 49th Street, Austin, Texas 78756.

§ 337.92 Disinfectant and Chemical Feeders

(a) The swimming pool shall be equipped with a chlorinator, hypochlorinator, or other disinfectant feeder or feeders which meet the following requirements:

(1) Shall be of sturdy construction and materials which will withstand wear, corrosion, or attack by disinfectant solutions or vapors and which are not adversely affected by repeated regular adjustments or other conditions anticipated in the use of the device. The feeder shall be capable of being easily disassembled for cleaning and maintenance. The design and construction shall be such as to preclude stoppage from chemicals intended to be used or foreign material that may be contained therein. The feeder shall incorporate failure proof features so that the disinfectant cannot feed directly into the swimming pool, the pool piping system, water supply system, or the swimming pool enclosure under any type of failure of the equipment or its maintenance.

(2) Shall be capable of supplying at least the equivalent of one pound of chlorine per 24 hours for each 10,000 gallons of indoor swimming pool capacity and 1 pound per 24 hours for each 5,000 gallons of outdoor pool, plus or minus 25%.

(3) Shall have a graduated and clearly marked dosage adjustment to provide flows from full capacity to 10% of such capacity. The device shall be capable of continuous delivery within 10% of the dosage at any setting.

(b) When compressed chlorine is used, the following additional features shall be provided.

(1) The chlorine and chlorinating equipment shall be in a separate, well ventilated room. Such rooms should not be below ground level and shall be provided with forced draft vents no more than one foot above the floor which terminate out-of-doors. The control switch for this unit shall be located outside the chlorinator room and shall be clearly marked "Turn On Before Entering." The door of the room shall not open to the swimming pool and should open to the outside.

(2) The chlorinator equipment shall be of rugged design, capable of withstanding wear without developing leaks.

(3) Chlorine cylinders shall be anchored to prevent their falling over. A valve stem wrench shall be maintained on the chlorine cylinder so the supply can be shut off quickly in the case of an emergency. Valve protection hood shall be kept in place except when the cylinder is connected.

(4) The chlorine feeding device shall be designed so that during accidents or interruptions of the water supply, leaking chlorine gas will be conducted to the out-of-doors.

(5) The chlorinator shall be a solution feed type, capable of delivering chlorine at its maximum rate without releasing chlorine gas to the atmosphere.

(6) The chlorinators shall be designed to prevent the backflow of water into the chlorine solution container.

(7) A gas mask designed for use in a chlorine atmosphere and of a type approved by the U.S. Bureau of Mines shall be provided. In addition, replacement canisters shall be provided and a record shall be kept of gas mask usage to insure that the mask will be serviceable when needed.

(8) The gas mask shall be kept in a closed cabinet, accessible without a key, located outside of the room in which the chlorinator is maintained.

(9) Installation of chlorinator equipment, operation and maintenance thereof shall be carried on by and under the supervision of personnel experienced with such equipment.

(c) When a hypochlorite solution is used to be fed through hypochlorinator equipment, such equipment shall

also provide the following additional features.

(1) Feed shall be positive under all conditions of pressure in the circulating system and without artificial constriction of the pump suction line whether this line is under vacuum or pressure head.

(2) Regulation shall be provided to insure constant feed with varying supply or back pressure.

(3) Positive features to prevent backflow from recirculation system to the solution container and provision for reducing to a minimum the entry into the swimming pool of free calcium released from calcium hypochlorite.

(4) Provision to prevent siphoning of hypochlorite solution when the recirculation pump and hypochlorinator are both turned off.

(d) Equipment and piping used to apply chemicals to the water shall be of such size, design, and material that they may be cleaned and will be free from clogging, preferably of the positive displacement type. All material used for such equipment and piping shall be resistant to action of chemicals to be used therein.

§ 337.93 Lighting, Ventilation, and Electrical Requirements

(a) Where underwater lighting is used, not less than 0.5 watts shall be employed per square foot of swimming pool water surface area. Such lights shall be spaced to provide illumination so that all portions of the pool, including the bottom, may be readily seen without glare.

(b) Area lighting shall provide at least 0.6 watts per square foot of deck area.

(c) All electrical wiring shall conform with the National Electrical Code of the National Underwriters Laboratory and local ordinances and codes.

(d) No overhead electrical wiring shall pass within 20 feet of the swimming pool enclosure.

(e) All indoor swimming pools, bathhouses, dressing rooms, shower rooms and toilet spaces shall be adequately

ventilated either by natural or mechanical means.

§ 337.94 User Loading

(a) For the purpose of computing user loading, those portions of the swimming pool five feet or less in depth shall be designated as "nonswimmer' areas. Portions of the pool over five feet in depth shall be designated as the "swimming' area.

(b) In order to compute swimmer and non-swimmer capacity, swimming pool areas shall be determined as follows:

(1) Ten square feet of pool water surface area shall be provided for each non-swimmer expected at time of maximum load.

(2) Twenty-four square feet shall be provided for each swimmer expected at time of maximum load.

(3) Three hundred square feet of pool water surface area shall be reserved around each diving board or diving platform, and this area shall not be included in computing the area of the swimming section.

(c) Computed user loading for pools with extensive deck areas for lounging or sun bathing shall be evaluated with regard to similar facilities currently in operation.

§ 337.95 Bathhouses, Toilets, and Showers

(a) This section is not intended to imply that bathhouses, toilets, and showers must be provided at all pools. Hotel, motel, trailer house camp and apartment pools limited to the use of residents and their nonpaying guests shall not be required to furnish such facilities. When these facilities are provided, they shall be in conformance with this section.

(b) Bathhouses to be used simultaneously by both sexes shall be divided into two parts separated by a tight partition, each designated for men or women. The entrances and exits shall be screened to break line of sight.

(c) Floors of bathhouses shall be of smooth-finished material with non-slip surface, impervious to moisture and sloped to a drain. Junctions between walls and floors shall be coved.

(d) Walls and partitions shall be of smooth, impervious material, free from cracks or open joints. Partitions between dressing rooms shall terminate at least 10 inches above the floor or shall be placed on continuous raised masonry or concrete bases at least four inches high. Lockers shall be set either on solid masonry bases four inches high or on legs with bottom of locker at least 10 inches above the floor. Lockers shall be properly vented.

(e) Toilet and shower facilities shall be provided on the basis of the following fixture schedule.

(1) Schedule.

T25S337.95(e)(1)

(2) Fixture schedules should be increased for swimming pools at schools or similar locations where bather loads may reach peaks due to schedules of use.

(f) The layout of the bathhouse shall be such that the bathers, on leaving the dressing room, pass the toilets and showers en route to the swimming pool.

(g) Showers shall be supplied with water at a temperature of at least 90 degrees Fahrenheit at a rate of at least three gallons per minute. Thermostatic, tempering, or mixing valves shall be installed.

§ 337.96 Safety Requirements--Lifesaving Equipment

(a) Swimming pools operated primarily for unorganized use and having an area of more than 2,250 square feet of water surface area shall be provided with an elevated lifeguard platform or chair. In pools with 4,000 square feet or more of water surface area, additional elevated chairs or stations shall be provided, located so as to provide a clear, unobstructed view of the pool bottom in the area under surveillance.

(b) One unit of lifesaving equipment shall consist of the following: A float board, ring buoy not more than 15 inches in diameter to which shall be attached a 60-foot length of 3/16 inch rope; a life pole or shepherd's crook type of pole having blunted ends with the minimum length of 12 feet; a separate throwing line of 1/4 inch rope with length not less than 1 1/2 times the maximum width of pool. Not less than one unit of equipment, as above, shall be provided at every public swimming pool. One unit shall be presumed to be adequate for 2,000 square feet of water surface area, and one additional unit shall be provided for each additional 2,000 square feet or major fraction thereof of water surface where there is no lifeguard on duty.

(c) Every swimming pool shall be equipped with a standard 24 unit first aid kit which shall be kept filled and ready for use.

(d) Lifesaving equipment shall be mounted in conspicuous places, distributed around swimming pool deck, at lifeguard chairs, or elsewhere, readily accessible, its function plainly marked and kept in repair and ready condition. Bathers or others shall not be permitted to tamper with, use for any purpose other than its intended use, or remove such equipment from its established location.

(e) Where no lifeguard service is provided, a warning sign shall be placed in plain view and shall state "Warning - No Lifeguard on Duty" with clearly legible letters at least four inches high. In addition, the sign shall also state "Children Should Not Use Pool Without An Adult In Attendance."

(f) There shall be a telephone readily accessible to every swimming pool. Telephone numbers of the nearest ambulance station and physician's office shall be posted near the telephone.

